means and selecting said speech signal whose average S/N value and average voice power are greater than respective predetermined threshold values as said speech signal suitable for speech recognition.

A marked-up copy of the amended claims is attached as required under 37 C.F.R. § 1.121.

REMARKS

Applicants, thank the Examiner for the courtesy of an interview on May 1, 2003.

The following remarks are fully and completely responsive to the Office Action dated November 4, 2002. Claims 1-18 are pending in this application. In the outstanding Office Action, claims 3, 8, 9, 14 and 15 were objected to; and claims 1-2, 7-8, and 13-14 and claims 5-6, 11-12, and 17-18 as dependent on claims 1-2, 7-8, and 13-14 respectively were rejected under 35 U.S.C. § 103(a) (four different rejections). Claims 3-4, 11-12, and 15-16 were acknowledged as containing allowable subject matter. Claims 5-6, 11-12, and 17-18 as dependent on claims 3-4, 11-12, and 15-16 also were acknowledged as containing allowable subject matter. No new matter has been entered. Claims 1-18 are presented for consideration.

Claim Objections

Claims 3, 8, 9, 14 and 15 were objected to because of informalities recited in the Office Action dated November 4, 2002. The amendments to claims 3, 8, 9, 14 and 15 correct these informalities. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the objection to claims 3, 8, 9, 14 and 15.

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35 U.S.C. § 103(a)

Claims 1, 7 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Everhart (U.S. Patent No. 6,230,138). In making this rejection, the Office Action asserts that this reference teaches and/or suggests each and every element of the claimed invention. Applicant respectfully requests reconsideration of this rejection.

Claim 1 recites a speech recognition system. The system includes a plurality of voice pickup means for picking up uttered voices. Determination means determines a speech signal suitable for speech recognition from speech signals output from the plurality of voice pickup means. Speech recognition means performs speech recognition based on the speech signal determined by the determination means.

Claim 7 recites a speech recognition system that includes a plurality of voice pickup sections for picking up uttered voices. A determination section determines a speech signal suitable for speech recognition from speech signals output from the plurality of voice pickup sections. A speech recognizer performs speech recognition based on the speech signal determined by the determination section.

Claim 13 recites a speech recognition method for a speech recognition system having a plurality of voice pickup means for picking up voices. This method includes a voice pickup step of picking up uttered voices using the plurality of voice pickup means. A determination step determines a speech signal suitable for speech recognition from speech signals output from the plurality of voice pickup means. A speech recognition step performs speech recognition based on the speech signal determined by the determination step.

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As discussed in the interview, Everhart discloses a method and apparatus for controlling multiple speech engines in an in-vehicle speech recognition system. This system includes a microphone 42 and pushed-to-talk (PTT) control 44 mounted near each speaking location. Once a driver/passenger depresses a PTT control 44, a selector 76 receives a PTT control signal. In some embodiments, each PTT control 44 produces a unique location signal so that the selector 76 can distinguish the control signals into an address. The main processor 48 of the selector 76 then processes the location signal using a selection application 56 to determine which speech engine recognition algorithm should be used to process the audio signal from the microphone 42.

In Everhart, the selector 76 then relays a PTT selection signal to the selected speech engine 74. Thereafter, a listening mode within the selected speech processor 70 is initiated and the speech processor 70 receives the audio signals from the selected microphone 42. The speech processor then processes the digitized signals using the recognition algorithms of the selected speech engine to identify a matching voice command from the selected active grammar.

The Office Action asserts that determining the speech signal suitable for speech recognition from speech signals output from the plurality of voice pickup means is a well-known part of a speech recognition engine. Therefore, the Office Action asserts that it would be obvious for a person with ordinary skill in the art of speech signal processing to include a determining means for determining speech signal suitable for speech recognition from speech signals output from said plurality of voice pickup means to avoid errors produced by miss-recognizing noise as voice.

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The Office Action supports this assertion by citing the following references: Fedele (U.S. Patent No. 4,627,091) citing the Abstract, lines 10-11; Bowen (U.S. Patent No. 5,625,697) column 9, line 1; Lee (U.S. Patent No. 4,449,238) column 1, line 48 to column 2, line 9; Furukawa (Japanese Patent 02-077799) Abstract, line 3; Julstrom (U.S. Patent No. 5,297,210) column 6, lines 26-27; Hunt (U.S. Patent No. 5,319,736) item 30 of Figure 3; and Peters (U.S. Patent No. 6,134,524) preamble of claim 1. As discussed in the interview, the Office Action, however, failed to consider that this claim element is a means-plus-function claim element under 35 U.S.C. § 112, paragraph 6.

When evaluating a means-plus-function claim element, the Office Action must identify prior art that teaches the function recited in the claim element, i.e., "selecting a speech signal suitable for speech recognition from speech signals output from said plurality of voice pickup means". Once the Office Action has identified prior art that teaches the same function, then the Office Action must identify and show that the structure, material or acts that perform the function in the prior art are identical or equivalent to the structure, material or acts described in the specification that have been identified as corresponding to the claimed means-plus-function element.

As discussed in the interview, the Office Action may have identified references that teach and/or suggest the recited function. The Office Action, however, has failed to identify any specific structure in any of the prior art that is identical to, or equivalent to, the structure utilized to perform the recited function in the present application. Accordingly, the Office Action has failed to provide adequate support for the rejection of claims 1, 7 and 13 under 35 U.S.C. § 103(a).

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Applicants have also reviewed the cited prior art and did not identify any specific structure in any of the prior art that is identical to, or equivalent to, the structure utilized to perform the recited function in the present application

Furthermore, Everhart teaches away from using the recited determining means since Everhart utilizes a push-to-talk control 44 to identify the location of the microphone which is receiving the voice command. Accordingly, it does not appear obvious that one of ordinary skill in the art would add the recited determining means to Everhart since Everhart uses a push-to-talk control 44 to identify which microphone should be active and monitored for a voice command.

Everhart fails to teach and/or suggest the claimed invention. Specifically, Everhart fails to teach and/or suggest a determining means for determining a speech signal suitable for speech recognition from speech signals output from the plurality of voice pickup means. Consequently, Applicant requests reconsideration and withdrawal of this rejection of claims 1, 7 and 13 under 35 U.S.C. § 103(a).

Claims 2, 8 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Everhart (discussed above) in view of Fedele (U.S. Patent No. 4,627,091). In making this rejection, the Office Action asserts that the combination of these two references teaches and/or suggests each and every element of the claimed invention. The Office Action also asserts that it would be obvious to one of ordinary skill in the art to combine these two references. Applicant respectfully requests reconsideration of this rejection.

The Office Action admits that Everhart fails to teach and/or disclose any specific component or process that selects the speech signals output from the plurality of voice

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pickup means whose level is equal to or higher than a predetermined speech level and continues over a predetermined time as a speech signal suitable for speech recognition. The Office Action cites Fedele as correcting this deficiency in Everhart.

Fedele teaches in the Background section that it is well known in speech recognition systems to select a speech level equal to or higher than a predetermined level as a speech signal suitable for processing. Fedele also teaches a speech detecting apparatus, where not only the voice portion but also the unvoiced portion of the speech can be detected and stored. Thus, Fedele teaches holding data corresponding to a fixed time period prior to the voice speech in which the amplitude of data is larger than a predetermined value. Fedele does not disclose, however, that the speech signals output from the plurality of voice pickup means whose speech level is equal to or higher than a predetermined speech level and continues over a predetermined period of time is selected as the speech signal suitable for speech recognition.

Fedele is not cited for and does not correct the deficiencies discussed above in Everhart.

The combination of Fedele and Everhart fails to teach and/or suggest each and every element of the claimed invention. Specifically, the combination of these two references fails to teach and/or suggest the recited determination means for determining a speech signal suitable for speech recognition from speech signals output from the plurality of voice pickup means. The combination of these two references also fails to teach and/or suggest that the speech signals output from the plurality of voice pickup means whose speech level is equal to or higher than a predetermined speech

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level <u>and</u> continues over a predetermined time period is selected as the speech signal for speech recognition. Accordingly, Applicant requests reconsideration and withdrawal of the rejection of claims 2, 8 and 14 under 35 U.S.C. § 103(a).

Claim 5 (as depending on claims 1 or 2), claim 11 (as depending on claims 7 or 8) and claim 17 (as depending on claims 13 or 14) appear to be rejected based on the combination of Everhart (discussed above), Fedele (discussed above) and Bowen (U.S. Patent No. 5,561,737). In making this rejection, the Office Action asserts that it would be obvious to one of ordinary skill in the art to combine these three references. The Office Action also asserts that the combination of these three references teaches and/or suggests the claimed invention.

While each of these three references may disregard and/or treat speech signals which are other than the speech signals suitable for speech recognition as noise signals, these references either alone or in combination fail to teach and/or suggest the structure and/or its equivalent of the recited determination means for selecting a speech signal suitable for speech recognition from speech signals output from the plurality of voice pickup means. Therefore, none of these references correct the deficiencies discussed in Everhart above. Therefore, Applicants request reconsideration of this rejection under 35 U.S.C. § 103(a)

Claim 6 (as depending on claims 1 or 2), claim 12 (as depending on claims 7 or 8) and claim 18 (as depending on claims 13 or 14) appear to be rejected based on the combination of Fedele and Everhart. In making this rejection, the Office Action asserts that it would be obvious to combine these two references and that the combination of these two references teaches each and every element of the claimed invention.

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The Office Action admits that Everhart fails to teach that the meaning of other speech signals than the speech signals suitable for speech recognition is determined to be those speech signals whose average S/N value and average voice power become minimum and that such signals are treated as noise by the determination means. The Office Action cites column 2, lines 13-18 of Fedele as correcting this deficiency in Everhart.

Column 2, lines 13-18 of Fedele recite the following:

"What is required is a system which stores an entire word or phrase, including the unvoiced segments of low-energy content at the beginning of a word, but which does not store substantial portions of background noise of similar low-energy content."

The section of Fedele cited by the Office Action fails to teach and/or suggest using either the average signal-to-noise value or the average voice power to determine which speech signals are treated as noise by the determination means. In contrast, this section of Fedele teaches storing the low-energy content of every speech signal in a buffer for a period of time in the event that such low-energy content is required for speech recognition processing. Accordingly, Fedele fails to correct the deficiencies noted by the Office Action in Everhart. Therefore, Applicants request reconsideration and withdrawal of this rejection under 35 U.S.C. § 103(a).

Allowable Subject Matter

The Office Action stated that claims 3-4, 11-12, and 15-16 contained allowable subject matter and that claims 5-6, 11-12, and 17-18 as dependent on claims 3-4, 11-12, and 15-16 also contained allowable subject matter. These claims were objected to

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as being dependent on a rejected base claim. As discussed above, claims 1,7, and 13 have been distinguished from the prior art. Thus, claims 3-4, 11-12, and 15-16 and claims 5-6, 11-12, and 17-18 as dependent on claims 3-4, 11-12, and 15-16 depend from allowable claims. Therefore, Applicants request reconsideration and withdrawal of this rejection.
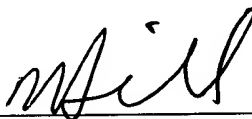
Conclusion

Applicant's amendments and remarks have overcome the objections and rejections set forth in the Office Action dated November 4, 2002. Applicants amendment of claims 3, 8, 9, 14 and 15 overcomes the objection to these claims. Applicant's remarks have distinguished claims 1-2, 7-8, and 13-14 and claims 5-6, 11-12, and 17-18 as dependent on claims 1-2, 7-8, and 13-14 respectively from the cited prior art and thus overcome the rejections of these claims under 35 U.S.C. § 103(a)(four different rejections). Claims 3-4, 11-12, and 15-16 were acknowledged as containing allowable subject matter. Claims 5-6, 11-12, and 17-18 as dependent on claims 3-4, 11-12, and 15-16 also were acknowledged as containing allowable subject matter. Accordingly, claims 1-18 are in condition for allowance. Therefore, Applicant respectfully requests consideration and allowance of claims 1-18.

Applicant submits that the application is now in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicant respectfully requests that the Examiner contact the undersigned attorney by telephone if it is believed that such contact will expedite the prosecution of the application.

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The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper to Deposit Account No. 01-2300, making reference to attorney docket number 107156-00019.

Respectfully submitted,

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Enclosures: Marked-Up Copy of Amended Claims
Petition for Extension of Time
Notice of Appeal

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MARKED-UP COPY OF AMENDED CLAIMS
AS REQUIRED UNDER 37 C.F.R. § 1.121

3. (Amended) The speech recognition system according to claim 1, wherein said determination means acquires an average S/N value and average voice power of each of said speech signals output from said plurality of voice pickup means and [determines that of] selects said speech signal whose average S/N value and aaverage voice power are greater than respective predetermined threshold values as said speech signal suitable for speech recognition.

8. (Amended) The speech recognition system according to claim 7, wherein that of said speech signals output from said plurality of voice pickup sections whose speech level is equal to or higher than a predetermined speech level and continues over a predetermined period of time is [determined] selected as said speech signal suitable for speech recognition.

9. (Amended) The speech recognition system according to claim 7, wherein said determination section acquires an average S/N value and average voice power of each of said speech signals output from said plurality of voice pickup sections and [determines that of] selects said speech signal whose average S/N value and average voice power are greater than respective predetermined threshold values as said speech signal suitable for speech recognition.

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14. (Amended) The speech recognition method according to claim 13, wherein that of said speech signals output from said plurality of voice pickup means whose speech level is equal to or higher than a predetermined speech level and continues over a predetermined period of time is [determined] selected as said speech signal suitable for speech recognition.

15. (Amended) The speech recognition method according to claim 13, wherein said determination step includes a step of acquiring an average S/N value and average voice power of each of said speech signals output from said plurality of voice pickup means and [determining that of] selecting said speech signal whose average S/N value and average voice power are greater than respective predetermined threshold values as said speech signal suitable for speech recognition.

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